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6 A bidirectional coherent acoustic communication system for underwater vehicle

8 Multicarrier coherent communications for the underwater acoustic chann

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Accession number & update

0006201734 20051201.

Title

A bidirectional **coherent acoustic** communication system for **underwater** vehicles.

Conference information

IEEE Oceanic Engineering Society. OCEANS'98. Conference Proceedings, Nice, France, 28 Sept.-1 Oct. 1998.

Source

IEEE Oceanic Engineering Society. OCEANS'98. Conference Proceedings (Cat. No.98CH36259), 1998, vol.1, p. 482-6
vol.1, 5 refs, pp. 3 vol. xxxi+1853, ISBN: 0-7803-5045-6.

Publisher: IEEE, New York, NY, USA.

Author(s)

[Freitag-L](#), [Grund-M](#), [Singh-S](#), [Smith-S](#), [Christenson-R](#), [Marquis-L](#), [Catipovic-J](#).

Author affiliation

Freitag, L., Grund, M., Singh, S., Woods Hole Oceanogr. Instn., MA, USA.

Abstract

An **acoustic** modem for bidirectional communication with an unmanned **underwater** vehicle has been developed and installed on the Florida Atlantic University Ocean Explorer. The modem is used to test and demonstrate two-way **phase-coherent communications** between surface platforms and AUVs. However, in addition to serving as a testbed for investigating specific issues associated with high-rate vehicle **communications**, the modem has been used in actual practice to transmit vehicle status information, CTD data and compressed images to observers on the surface in near real-time. The system includes both medium frequency (2-4 kHz) and high frequency (20-30 kHz) transmission capability for short and medium range data uplink, as well as a towed array for reception at the medium frequency (MF) and a small vertical array for use at the high frequency (HF). The communication system has been tested in Florida, New England and the Bahamas where ranges of 2 km at HF and 4 km at MF have been achieved at burst rates of 6700 bps and 1670 bps respectively in water depths of 10-30 m.

Descriptors

[ACOUSTIC-DEVICES](#); [ACOUSTIC-TRANSDUCER-ARRAYS](#); [MODEMS](#); [REMOTELY-OPERATED-VEHICLES](#);
[UNDERWATER-ACOUSTIC-TELEMETRY](#); [UNDERWATER-VEHICLES](#).

Classification codes

[B6270 Other-telecommunication-systems-and-equipment*](#);

[B6210J Telemetry](#);

[B6220J Modems](#).

Keywords

bidirectional-coherent-acoustic-communication-system; **underwater-** vehicles; **acoustic-modem**; **unmanned-underwater-vehicle**; Florida-Atlantic-University-Ocean-Explorer; **two-way-phase-coherent- communications**; AUV;

vehicle-status-information; CTD-data; compressed- images; data-uplink; towed-array; vertical-array; burst-rates; 6700-bit/s; 10-to-30-m; 2-to-4-kHz; 1670-bit/s; 20-to-30-kHz.

Treatment codes

P Practical;
X Experimental.

Numerical indexing

bit rate: 6.7E03 bit/s.
depth: 1.0E01 to 3.0E01 m.
frequency: 2.0E03 to 4.0E03 Hz.
bit rate: 1.67E03 bit/s.
frequency: 2.0E04 to 3.0E04 Hz.

Language

English.

Publication type

Conference-proceedings.

Availability

CCCC: 0 7803 5045 6/98/\$10.00.

Digital object identifier

10.1109/OCEANS.1998.725794.

Publication year

1998.

Publication date

19980000.

Edition

1999012.

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Accession number & update

0005545558 20051201.

Title

Multicarrier **coherent communications** for the **underwater acoustic** channel.

Conference information

OCEANS 96 MTS/IEEE Conference Proceedings. The Coastal Ocean - Prospects for the 21st Century, Fort Lauderdale, FL, USA, 23-26 Sept. 1996.
Sponsor(s): Marine Technol. Soc; OES; IEEE.

Source

'Prospects for the 21st Century' Conference Proceedings. OCEANS 96 MTS /IEEE (Cat. No.96CH35967), 1996, vol.3, p. 1125-30 vol.3, 6 refs, pp. 4 vol. (1564+vii+145), ISBN: 0-7803-3519-8.
Publisher: IEEE, New York, NY, USA.

Author(s)

Bejjani-E, Belfiore-J-C.

Author affiliation

Bejjani, E., Belfiore, J.-C., Dept. Commun., Ecole Nat. Superieure des Telecommun., Paris, France.

Abstract

We propose a multicarrier transmission scheme for severely spread channels-but not overspread. The **underwater acoustic** channel is a good representative of this kind of channel. The technique of orthogonal data and pilot symbols allows **coherent** detection and therefore the use of QAM signal constellations. Some simulated performances of the proposed scheme are presented in both Rayleigh and Rician multipath fading. Acceptable error rate floors are shown to be possible for channel spread factor reaching 0.15.

Descriptors

ACOUSTIC-SIGNAL-DETECTION; FADING; MULTIPATH-CHANNELS; QUADRATURE-AMPLITUDE-MODULATION; RAYLEIGH-CHANNELS; RICIAN-CHANNELS; UNDERWATER-SOUND.

Classification codes

B6270 Other-telecommunication-systems-and-equipment*;
B6120 Modulation-and-coding-methods.

Keywords

multicarrier-coherent-communications; **underwater-acoustic-channel**; multicarrier-transmission-scheme; severely-spread-channels; orthogonal-data; pilot-symbols; **coherent-detection**; QAM-signal-constellations;

performances; Rayleigh-multipath-fading; Rician-multipath-fading; error-rate-floors; channel-spread-factor.

Treatment codes

T Theoretical-or-mathematical.

Language

English.

Publication type

Conference-proceedings.

Availability

CCCC: 0 7803 3519 8/96/\$5.00.

Digital object identifier

10.1109/OCEANS.1996.569060.

Publication year

1996.

Publication date

19960000.

Edition

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1997. (INZZ) Extended-aperture **underwater acoustic** multisource azimuth/elevation direction-finding using uniformly but sparsely spaced vector hydrophones.

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